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Spruce budworm
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EFFECTS OF AERIAL SPRAYING UPON PARASITES OF THE SPRUCE BUDWORM

by

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Since 1949, spruce budworm epidemics in the forests of Oregon and Washington have been treated with aerial sprays of DDT. This direct control action is undertaken as an emergency measure to prevent tree killing and hold the budworm in check until natural control factors can become effective. Since natural factors are depended upon to ultimately control the budworm, the effects of the spraying upon these agents is of considerable importance. Parasites are known to be some of our most important agents of natural control. The effects of spraying 3,000,000 acres has been evaluated in relation to the relative abundance of the principal parasites of the budworm.

The principal parasites of the budworm in Oregon and Washington are Apanteles fumiferanae, Glypta fumiferanae, and Campoplex sp. These are all internal parasites which attack the immature, hibernating budworm and finally kill and emerge from the budworm when it reaches the fourth or fifth instar. These three species have been responsible for approximately two-thirds of the total budworm parasitism in this region.

Evaluation of the effects of the spraying upon these parasites was carried out on representative sprayed and unsprayed areas in Oregon and Washington. Eight study areas were established in localities where moderate to heavy infestations were sprayed in 1949 and 1950. Three additional study areas were established in moderate to heavy unsprayed infestations. Larvae were collected from all study areas at approximately the same stage of development, when most of the budworm were in the fourth instar. At this stage few if any parasites have emerged from the hosts, yet the collection is the simplest and least time consuming. On the eight sprayed areas over 500 trees were examined and nearly 2000 15-inch twigs sampled annually. On the three unsprayed areas 100 trees and about 300 twigs were sampled annually. Approximately 100 larvae were taken annually from the sprayed plots and 300 larvae from the unsprayed plots. These larvae were dissected to determine the degree of parasitism.

The abundance of the three species of parasites was found to be variable from area to area, and from year to year. However, Apanteles and Glypta are generally the most effective with Campoplex the least effective. Campoplex shows its greatest effect on very low host populations and in 1951, one to two years after spraying, accounted for 23 percent parasitism on some sprayed areas. In epidemic infestations this species has caused only 1 to 3 percent parasitism.

Based on summary of 3 yrs data 1st year records in sprayed areas show much higher parasitism. will calc this vmc

A comparison of percentage mortalities caused by the three species on sprayed and unsprayed areas shows an average of 35 percent parasitism on all sprayed areas and 25 percent on unsprayed areas. This parasitism on sprayed areas has declined slightly each year since spraying while on unsprayed areas the percentage has remained static. However, even now, three to four years after spraying, these important parasites are still more abundant on sprayed areas than on unsprayed areas.

It maybe concluded from the results of these investigations that:

(1) The parasites attacking the hibernating spruce budworm larvae in Oregon and Washington will survive the aerial sprays of DDT that are now in use for budworm control.

(2) These parasites may survive in sufficient numbers to exert even greater natural control of the budworm than before spraying.